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DESCRIPTION

HEAT INSULATING CONTAINER

FIELD OF THE INVENTION

[0001] The present invention relates to a heat insulating container that includes a container body having a bottomed tubular shape for placing therein a content such as very hot food or drink and an outer shell covering the container body with a space between the outer shell and a peripheral wall of the container body, through which heat insulating effect is produced.

BACKGROUND OF THE INVENTION

[0002] There have been hitherto proposed various types of heat insulating containers for placing therein instant foods or the like such as soup or noodle served by pouring boiled water, or for placing therein a separately heated drink or the like.

[0003] Of them, one type of the heat insulating containers includes, as illustrated in FIG. 14, a container body 100 molded into a bottomed tubular shape, an outer shell 150 covering a peripheral wall 101 of the container body 100, in which a space 200 is created between the peripheral wall 101 of the container body 100 and the outer shell 150, making it difficult to have heat of a content P placed in the container body 100 transferred to the outer shell 150 by the interposition of the space.

[0004] The outer shell 150 is made up of a tubular portion 151 disposed opposite to the peripheral wall 101 of the container body 100, and a horizontal annular portion 152 extending from a lower end of the tubular portion 151 towards the center of the tubular portion 151.

[0005] The outer shell 150 (the tubular portion 151 and the horizontal annular

portion 152) is molded into a shape as mentioned above by placing a foamed resin sheet (not shown) that has heat shrinkability and has been formed into a tubular shape onto a substantially cylindrical mold (not shown), and heating the same to allow the foamed resin sheet to be shrunk.

[0006] Meanwhile, the outer shell having the above structure formed with the horizontal annular portion 152 copes with an external force such as a grasping force applied in a radial direction to a lower end side of the tubular portion 151, by the strength in a cross section (cross section crossing the direction in which the external force acts), that is, the buckling strength of the horizontal annular portion 152 in a direction orthogonal to the thickness direction of the horizontal annular portion 152.

[0007] However, when the external force has been applied, as mentioned above, the external force acts locally to an inner peripheral edge of the horizontal annular portion 152, causing buckling in the inner peripheral edge, which may lead to inward or outward buckling or breaking, of the horizontal annular portion 152, posing a problem of not producing a satisfactory strength in the radial direction in the lower end side of the outer shell 150 merely by the buckling strength of the horizontal annular portion 152.

[0008] Therefore, the heat insulating container has a bottom plate 160 bonded by heat sealing to an inner surface of the horizontal annular portion 152 so as to close a hole 153 defined by the horizontal annular portion 152 of the outer shell 150, thereby allowing the horizontal annular portion 152 and the bottom plate 160 to receive the external force applied in the radial direction, and hence preventing the external force to locally act and producing the strength in the radial direction in the lower end side of the outer shell 150 (heat insulating container).

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

[0009] However, the heat insulating container having the above structure is required to have the bottom plate 160 bonded so as to close the hole 153 defined by the horizontal annular portion 152 of the outer shell. This poses a problem of inviting the increase in manufacturing cost and material cost when manufacturing.

[0010] In consideration of the above problems, it is an object of the present invention to provide a heat insulating container that is capable of reducing the number of steps and materials for manufacturing, as well as ensuring a satisfactory strength in the lower end side of the outer shell.

Means to Solve the Problems

[0011] A heat insulating container of the present invention has been conceived to achieve the above object. According to claim 1, there is provided a heat insulating container including a container body having a bottomed tubular shape and an outer shell that is formed by a foamed resin sheet having heat shrinkability and covers a peripheral wall of the container body with a space created between the peripheral wall and the outer shell, characterized in that the outer shell comprises a tubular portion disposed opposite to the peripheral wall of the container body and an annular portion extending from an opening edge of a lower end of the tubular portion towards the inside of the tubular portion, and the annular portion has a distal end and a proximal end, in which the distal end is located farther from an inner peripheral surface of the tubular portion than the proximal end is.

[0012] According to the thus structured heat insulating container, the annular portion has the distal end located farther from the inner peripheral surface of the tubular portion than the proximal end is, so that when external force acts on the tubular portion towards the center, the external force acts not in a direction orthogonal to the cross section of the annular portion (buckling direction in the annular portion), but in a direction crossing the plane of the annular portion.

[0013] Accordingly, the external force acts to bend the annular portion and this bending action causes elastic force to the annular portion. Thus, it is possible to cope with the external force by the elasticity (elastic force) of the annular portion, and hence increase the strength of a lower end portion of the tubular portion, to which the proximal end of the annular portion is connected. Also, the external force can be absorbed by the bending action (elasticity) of the annular portion, so that the external force is not applied locally to the distal end (inner peripheral edge) or proximal end (outer peripheral edge), of the annular portion and hence deformation or breakage due to the buckling of the annular portion can be prevented.

[0014] Therefore, while omitting the necessity to provide a bottom plate for closing a hole defined by an annular portion unlike the prior art, a satisfactory strength in the radial direction of the heat insulating container can be provided by the annular portion. Whereby, it is possible to omit the step of mounting a bottom plate in a manufacturing process, and hence reduce material costs and manufacturing costs.

[0015] According to claim 2, the outer shell may include a horizontal annular extension that extends from the distal end of the annular portion towards the center of the tubular portion. As described above, when the bending action occurs on the annular portion, the resulting elastic force acts thereto so as to expand the diameter of the opening (inner peripheral edge) of the distal end of the annular portion. The horizontal annular extension formed on the distal end of the annular portion increases the strength of the distal end of the annular portion so as to be able to limit the deformation of the distal end of the annular portion and efficiently disperse the external force in the peripheral direction of the annular portion and hence absorb the same. Whereby, it is possible to further increase the strength of the lower end side of the tubular portion (outer shell).

[0016] According to claim 3, the annular portion is preferably formed so as to have the distal end with a space to a bottom portion of the container body so that gas within the space is communicated with the outside via a lower end opening of the tubular portion.

[0017] With the above structure, even when air within the space between the peripheral wall of the container body and the tubular portion is heated via the peripheral wall of the container body by very hot content placed in the container body, it is possible to cool within the space by air convection caused in the space via a lower end opening of the tubular portion (outside air having a temperature lower than air within the space flows into the space, while air within the space is released to the outside) by lifting up (separating) the heat insulating container from a mounting surface thereof. Therefore, even if very hot content is placed in the heat insulating container for a long time, it is possible to prevent the tubular portion of the outer shell from being heated by air within the space and hence bring the heat insulating container in better conditions.

Effects of the Invention

[0018] As described above, according to the heat insulating container of the present invention, there is provided a container body having a bottomed tubular shape and an outer shell that is formed by a foamed resin sheet having heat shrinkability and covers a peripheral wall of the container body with a space created between the peripheral wall and the outer shell, in which the outer shell includes a tubular portion disposed opposite to the peripheral wall of the container body and an annular portion extending from an opening edge of a lower end of the tubular portion towards the inside of the tubular portion, and the annular portion has a distal end and a proximal end, in which the distal end is located farther from an inner peripheral surface of the tubular portion than the proximal end is. Whereby, it is possible to produce an excellent advantage to reduce the number of

steps and materials in manufacturing as well as ensuring a satisfactory strength of the lower end side of the outer shell.

Brief Description of the Drawings

[0019] FIG. 1 is a side view with a partially cross section of a heat insulating container according to a first embodiment of the present invention.

FIG. 2 is a partially cross sectional view of an upper end portion of the heat insulating container of the first embodiment.

FIG. 3 is a partially cross sectional view of a lower end portion of the heat insulating container of the first embodiment.

FIG. 4 is an entire perspective view of a mold and a press die for molding an outer shell of the first embodiment.

FIGS. 5 are explanatory views for molding steps of the outer shell of the first embodiment. FIG. 5(a) illustrates a state in which a tubular portion has been formed by placing a foamed resin sheet on the mold and heating the same. FIG. 5(b) illustrates a state in which a second end of the foamed resin sheet has been formed into a horizontal annular shape by heating. FIG. 5(c) illustrates a state in which the second end of the foamed resin sheet formed into the horizontal annular shape is being pressed by the press die. FIG. 5(d) illustrates a state in which an annular portion and a horizontal annular extension have been molded by the mold and the press die.

FIG. 6 is a front view of a heat insulating container according to a second embodiment of the present invention.

FIG. 7 is a vertical cross sectional view of the heat insulating container of the second embodiment.

FIG. 8 is an enlarged view with a partially cross section of a flange portion and its proximity, of the heat insulating container of the second embodiment.

FIG. 9 is an enlarged view with a partially cross section of a bottom

portion and its proximity, of the heat insulating container of the second embodiment.

FIG. 10 is a front view of a heat insulating container according to a third embodiment of the present invention.

FIG. 11 is a vertical cross sectional view of the heat insulating container of the third embodiment.

FIG. 12 is an enlarged view with a partially cross section of a flange portion and its proximity, of the heat insulating container of the third embodiment.

FIG. 13 is an enlarged view with a partially cross section of a bottom portion and its proximity, of the heat insulating container of the third embodiment.

FIG. 14 is a side view of a conventional heat insulating container with a partially cross section.

Description of the Reference Codes

[0020] 1: container body, 2: outer shell, 5: connection portion, 10: peripheral wall, 10a: upper peripheral wall portion, 10b: lower peripheral wall portion, 11: connection portion, 12: flange portion, 12a, 12b: pieces, 13: engaging protrusions, 14: bottom portion, 14a: bottom plate section, 14b: bottom connection section, 20: tubular portion, 21: annular portion, 22: curled portion, 23: horizontal annular extension, 40: space, 50: mold, 51: press die, 52: recess, 53: annular protrusion, 54: protrusion, 100a: gutter, 100b: ridge, 110: peripheral wall body part, 111: annular connection part, 112: large diameter part, 113: flange part, 113a: top plate section, 113b: downward extension, 114: lower tubular portion, 114a: thick tubular section, 114b: thin tubular section, 115: vertical rib, 117: reinforcing piece

Best Mode for Carrying out the Invention

[0021] Now, the description will be made for the first embodiment of the present invention with reference to the attached drawings.

[0022] A heat insulating container of this embodiment is made up of a container body 1 having a bottomed tubular shape, and an outer shell 2 that covers a peripheral wall 10 of the container body 1, as illustrated in FIG. 1.

[0023] The container body 1 is a resin molded product molded by a molding technique such as injection molding, blow molding, vacuum molding or pressure molding. The container body 1 is formed into a tubular shape with the peripheral wall 10 being decreased in diameter towards the lower end. An upper end of the peripheral wall 10 of the container body 1 is provided with an annular connection portion 11 that extends outward and has an outer peripheral edge connected with a lower end of an inner peripheral piece 12a of an annular flange portion 12 having a downwardly opening U-shaped cross section.

[0024] An outer peripheral piece 12b of the flange portion 12 has plural engaging protrusions 13 that bulge towards the inner peripheral piece 12a and are aligned in the peripheral direction with a predetermined distance from each other.

[0025] The outer shell 2 is formed from a foamed resin sheet having heat shrinkability, and includes a tubular portion 20 covering the peripheral wall 10 of the container body 1 so as to be disposed opposite to the peripheral wall 10, and an annular portion 21 extending (folded back) from a lower end of the tubular portion 20 towards the inside of the tubular portion 20. The description will be made later for the steps of molding the outer shell 2 by the use of the foamed resin sheet.

[0026] The tubular portion 20 has an upper end provided with a curled portion 22 that is curled towards the outside. The curled portion 22 is fitted in the flange portion 12 of the container body 1 while having a shape being at this position engageable with the engaging protrusions 13.

[0027] The annular portion 21 is formed with a distal end (inner peripheral edge)

disposed away from an inner peripheral surface of the tubular portion 20. Specifically, the annular portion 21 has a distal end (inner peripheral edge) positioned inwardly to the inside of the tubular portion 20 than a proximal end (outer peripheral edge) is, and is tapered towards the distal end. The incline angle of the annular portion 21 relative to the inner peripheral surface of the tubular portion 20 is set preferably in a range of 30 ° to 60 °.

[0028] A horizontal annular extension 23 extends from the inner peripheral edge of the annular portion 21 towards the center of the tubular portion 20.

[0029] In the thus structured heat insulating container, the container body 1 is placed in the outer shell 2 so as to have the inner peripheral surface of the tubular portion 20 disposed opposite to the outer peripheral surface of the peripheral wall 10 of the container body 1, and as illustrated in FIG. 2, the curled portion 22 is fitted in the flange portion 12 of the container body 1 so as to create a space 40 between the peripheral wall 10 of the container body 1 and the tubular portion 20 of the outer shell 2.

[0030] With the above positioning, as illustrated in FIG. 3, the distal end of the annular portion 21 and the inner surface of the horizontal annular extension 23 are disposed with a distance from the bottom portion 14 of the container body 1, and the space 40 is communicated with the outside via the distal end of the annular portion 21, the space between the horizontal annular extension 23 and the bottom portion 14 of the container body 1, a hole defined by the annular portion 21 and a lower end opening of the tubular portion 20.

[0031] The heat insulating container is structured so that when external force has been applied to the outer shell 2 (lower end portion) in the radial direction by grasping the outer shell 2, the external force acts in a direction towards the center of the tubular portion 20 (in a direction orthogonal to the center line of the tubular portion 20), and thus acts so as to cause radial shrinkage or flattening deformation,

of the opening edge of the lower end of the tubular portion 20. At the same time, the external force acts on the proximal end (outer peripheral edge portion) of the annular portion 21 in a direction towards the center of the tubular portion 20.

[0032] Accordingly, since the annular portion 21 is formed into an annular shape, which is tapered towards the inside of the tubular portion 20, the external force acts on the annular portion 21 in a direction crossing the plane thereof, so that reaction force in a direction different from the acting direction of the external force (in a direction as to expand the inner peripheral edge) is cased in the leading end side of the annular portion 21. Whereby, bending action is caused between the proximal end and the distal end, of the annular portion 21, and thus radial deformation of the tubular portion 20 due to the external force is prevented by elastic force caused in the annular portion 21 by the bending action.

[0033] That is, the heat insulating container is structured to have the annular portion 21 extending towards the inside of the tubular portion 20 and tapered to have the distal end located away from the inner peripheral surface of the tubular portion 20 so that when external force has been applied, elastic force is caused in the annular portion 21 and thus it is possible to produce a satisfactory radial strength to the lower end side of the outer shell 2 by utilizing the elastic force.

[0034] The heat insulating container is also structured to have the horizontal annular extension 23 extending from the distal end of the annular portion 21, thereby increasing the strength of the inner peripheral edge and its proximity of the annular portion 21 to limit deformation of the inner peripheral edge and its proximity of the annular portion 21 due to reaction force to the external force and hence achieve a further increased radial strength. That is, the strength of the lower end side of the tubular portion 20 is further increased by effectively utilizing, against the external force, the elasticity of the annular portion 21 caused between its proximal end and its distal end.

[0035] Furthermore, with the structure in which a clearance is created between the inner surfaces of the distal end of the annular portion 21 and the horizontal annular extension 23, of the outer shell 2 and the bottom portion 14 of the container body 1 (the annular portion 21 is formed to have the distal end thereof with a distance from the bottom portion 14 of the container body 1), even when air in the space 40 of the container body 1 is heated by a hot food product or the like placed therein, air convection is caused in the space 40 (outside air having a temperature lower than air heated in the space 40 flows in through the lower end opening of the outer shell 2) by lifting up the heat insulating container from a mounting surface, on which the heat insulating container has been mounted.

[0036] Thus, it is possible to suppress the temperature increase within the space 40, suppress the transfer of heat of air within the space 40 to the outer shell 2, and hence further enhance the function of the heat insulating container.

[0037] The heat insulating container has the annular portion 21 extending inwardly at an angle to the inner peripheral surface of the tubular portion 20 from the lower end of the tubular portion 20 so as to have a shape with a recessed portion on the bottom and therefore can be held with a finger engaged with the annular portion 21. Thus, it is possible to grasp and hold the heat insulating container in a stabilized manner without slipping-off the same. Furthermore, even when the heat insulating container is held with a finger engaged with the annular portion 21, the horizontal annular extension 23 extending from the inner peripheral edge (distal end) of the annular portion 21 can prevent the finger engaged with the annular portion 21 from touching the bottom portion 14 of the container body 1, and hence prevent burns or any other troubles with the container body 1 even when a food heated at a high temperature is placed therein, thus achieving safety.

[0038] Now, the description will be made for the steps of manufacturing the thus

structured outer shell 2. When manufacturing the outer shell 2, as illustrated in FIG. 4, a mold 50 for forming the tubular portion 20 of the outer shell 2, a press die 51 for forming the annular portion 21 and the horizontal annular extension 23, and a strip-like foamed resin sheet S (having been formed into a tubular shape in the Figure) for forming the outer shell 2 are first prepared. The description for the steps of forming the curled portion 22 is omitted, while the description for the mold 50, the press die 51 and the foamed resin sheet S will be first made prior to the description for the manufacturing steps of the outer shell 2.

[0039] The mold 50 has a shape corresponding to the shape of the tubular portion 20 with an outer diameter decreasing from a first end to a second end, and is formed into a truncated right circular cone. By the truncated right circular cone is meant a shape of a right circular cone with a vertex truncated in a direction orthogonal to the axis. The mold 50 has the diametrically smaller second end having a recess 52 formed therein for fittingly receiving the press die 51 and having an outer peripheral edge portion formed with an annular protrusion 53 having a substantially horizontal upper end. The annular protrusion 53 has an inner peripheral surface formed into a tapered shape so that the angle of an outer peripheral surface of the mold 50 relative to the inner peripheral surface of the annular protrusion 53 is set to correspond to the tapered angle of the annular portion 21 relative to the tubular portion 20 of the outer shell 2.

[0040] The press die 51 has a protrusion 54 for being fitted into the recess 52. The protrusion 54 is formed into a truncated right circular cone corresponding to the shape of the inner peripheral surface of the annular protrusion 53.

[0041] The short side of the foamed resin sheet S has a length longer than the length between the first end and the second end, of the mold 50. For the foamed resin sheet S, a sheet of foamed polystyrene having a first side with characters, patterns or the like printed thereon, which side turns to be an outer surface when

the outer shell 2 has been molded, and having a foaming rate of 2 to 10 times (preferably 2.5 to 7 times) having heat shrinkability. The foamed resin sheet S is heat shrinkable in one direction (lengthwise direction).

[0042] As foamed polystyrene for forming the foamed resin sheet S, there may be employed those produced by foaming general-use polystyrene with various foaming agents, or those produced by foaming with various forming agents an intermediate with a content of 50% by weight or more (preferably 70% by weight or more) of a styrene component, which intermediate has copolymer as a main component produced by copolymerizing polystyrene with butadiene, acrylonitrile, methacrylic acid, acrylic acid or acrylic ester. The foamed resin sheet S has a thickness of 0.1 to 1.0 mm and preferably 0.2 to 0.5 mm.

[0043] When manufacturing the outer shell 2 by the use of the thus structured mold 50 and press die 51, the foamed resin sheet S having the above structure is first formed into a tubular shape with both lengthwise ends bonded together. Under this state, the foamed resin sheet S can be heat shrunk in a circumferential direction (towards the center). The heat shrinkage of the foamed resin sheet S may be a heat shrinkage measured, for example, by immersing it in oil of a predetermined temperature for 10 seconds, and the heat shrinkage of the foamed resin sheet S of this embodiment formed into a tubular shape is, in the circumferential direction, 5 % or lower at 80°C and 30 to 60 % at 110°C.

[0044] The foamed resin sheet S formed into a tubular shape is fitted on the mold 50 so as to cover the outer peripheral surface thereof, with an opening edge of a first end of the foamed resin sheet S matched in position to a first end of the mold 50. Under this state, an opening edge of a second end of the tubular foamed resin sheet S lies outside the second end of the mold 50, as illustrated in FIG. 5(a).

[0045] By the application of heat to the foamed resin sheet S with blasts of hot air A, the foamed resin sheet S having heat shrinkability is shrunk in the radial

direction towards the center and thus brought into tight contact with the outer peripheral surface of the mold 50. Thus, the tubular portion 20 is formed. By the further application of heat to the foamed resin sheet S (particularly the second end), the second end is shrunk towards the center and directed towards the axis of the mold 50, and thus formed into an annular shape in a horizontal orientation, as illustrated in FIG. 5(b).

[0046] Under this state, the heating is stopped and the second end of the foamed resin sheet S having an annular shape in a horizontal orientation is pressed with the press die 51, as illustrated in FIG. 5(c). When this pressing operation is made, the heating to the foamed resin sheet S is stopped, but the foamed resin sheet S remains softened by the heat applied up to then. Therefore, as illustrated in FIG. 5(d), the second end of the foamed resin sheet S is smoothly pressed to the inside of the recess 52 of the mold 50 by the protrusion 54 of the press die 51 while being bent around an upper end of the annular protrusion 53.

[0047] Thus, the annular portion 21 is formed to have a tapered shape corresponding to the shape of the outer periphery of the press die 51, with a first end (lower end) of the tubular portion 20 acting as a proximal end. At the same time, shrinking force acts towards the center on a part of the tubular portion 20 closer to the second end than the annular portion 21, thereby enabling the second end to keep the annular shape in a horizontal orientation while being pressed to the inside of the tubular portion 20 (the recess 52 of the mold 50). Thus, the horizontal annular extension 23 is formed. Under this state, the press die 51 is moved away from the mold 50 and the mold 50 is removed, so that the outer shell 2 having the above structure is formed from the tubular foamed resin sheet S.

[0048] Therefore, as described above, it is not necessary to carry out the step of providing a bottom plate for closing a hole defined by an annular portion unlike the conventional technique, when manufacturing the outer shell 2 that is capable

of providing a satisfactory strength to the lower end side of the heat insulating container (outer shell 2). Hence, it is possible to reduce the manufacturing costs and the material costs for manufacturing the heat insulating container.

[0049] Now, the description will be made for a heat insulating container of the second embodiment of the present invention. In this embodiment, the identical or corresponding parts or members to those of the first embodiment are given the same names and the same reference characters as those of the first embodiment.

[0050] The heat insulating container of this embodiment is made up of a container body 1 having a bottomed tubular shape and an outer shell 2 that covers a peripheral wall 10 of the container body 1, as illustrated in FIGS. 6 and 7.

[0051] The container body 1 is a resin molded product molded by injection molding by using polypropylene, high-density polyethylene or the like as a material. The container body 1 is made up of a tubular peripheral wall 10, and a bottom portion 14 that closes a lower end opening of the peripheral wall 10.

[0052] The peripheral wall 10 is formed into a tubular, inverted conical shape with a diameter decreasing towards the lower end. Specifically, the peripheral wall 10 is made up of a tubular upper peripheral wall portion 10a defining an opening of the heat insulating container, a lower peripheral wall portion 10b having a diameter smaller than the upper peripheral wall portion 10a and disposed below the upper peripheral wall portion 10a, and an annular connection portion 5 for connection between an opening edge of a lower end of the upper peripheral wall portion 10a and an opening edge of an upper end of the lower peripheral wall portion 10b.

[0053] The upper peripheral wall portion 10a is made up of a tubular peripheral wall body part 110 with an opening edge of the lower end connected to an outer peripheral edge of the connection portion 5, an annular connection part 111 having an annular shape in a horizontal orientation with an inner peripheral edge

connected to an opening edge of an upper end of the peripheral wall body part 110, a tubular, large diameter part 112 with an opening edge of a lower end connected to an outer peripheral edge of the annular connection part 111, and a flange part 113 extending outwards from an opening edge of an upper end of the large diameter part 112.

[0054] The peripheral wall body part 110 is formed into a tubular, inverted conical shape with an outer diameter and an inner diameter decreasing towards the lower end. The peripheral wall body part 110 is formed with plural gutters 110a and plural ridges 110b, which extend the axial direction and are formed alternately in the circumferential direction.

[0055] The gutters 110a each define an inwardly curved surface in the circumferential direction, while the ridges 110b each define an outwardly curved surface in the circumferential direction. With this, the outer peripheral surface of the peripheral wall body part 110 defines a corrugated curved surface with the inwardly curved surfaces and the outwardly curved surfaces alternately formed.

[0056] In other words, the ridges 110b each have a gentle mountain shape in cross section, and the gutters 110a are defined by the connected portions between the adjacent ridges 110b. In this embodiment, the gutters 110a are spaced each other in the circumferential direction with a predetermined angle (about 7.5 ° in this embodiment) with the axis of the peripheral wall body part 110 as the center. Therefore, the plural ridges 110b are also formed to have the apexes of the adjacent ridges 110b with the gutters 110a therebetween spaced each other in the circumferential direction with a predetermined angle (7.5 ° in this embodiment) with the axis of the tubular peripheral wall body part 110 as the center

[0057] Reinforcing pieces 117 extend downwards from the lower end of the peripheral wall body part 110 of this embodiment so as to increase the radial strength of the container body 1. The reinforcing pieces 117 are formed with a

predetermined distance from the outer peripheral surface of the lower peripheral wall portion 10b (a lower tubular part 11 hereinafter described), each having lateral sides connected to later-described vertical ribs 115.

[0058] The annular connection part 111 has, as described above, the outer peripheral edge connected to the opening edge of the upper end of the peripheral wall body part 110, and is formed into a flange around the peripheral wall body part 110.

[0059] The large diameter part 112 has a substantially circular tubular shape and has an opening edge of the lower end connected to the outer peripheral edge of the annular connection part 111. With this, the large diameter part 112, the annular connection part 111 and the peripheral wall body part 110 together form a stepped portion around an opening of the upper end of the upper peripheral wall portion 10a (container body 1), so that a top surface of the annular connection part 111 can be used as a formed line providing an indication for the amount of boiled water or the like to be poured in.

[0060] The flange part 113 is made up of a top plate section 113a having an annular shape in a horizontal orientation and a downward extension 113b extending downwards from an outer peripheral edge of the top plate section 113a, and has a substantially L-shape in cross section. The flange part 113 has the top plate section 113a whose inner peripheral edge is connected to the opening edge of the upper end of the large diameter part 112, so that an upper surface of the top plate section 113a forms an upper end surface of the heat insulating container. The flange part 113 is designed to allow a sealing lid (not shown) made of a laminate of aluminium foil and synthetic resin film or paper to be detachably attached to the top plate section 113a, so as to seal the container body 1 with a content (such as instant noodles or soup eatable by pouring boiling water thereinto).

[0061] The lower peripheral wall portion 10b is made up of a lower tubular part 114 with an opening edge of an upper end connected to the upper peripheral wall portion 10a via the connection portion 5, and plural vertical ribs 115 vertically extending and projecting from an outer peripheral surface of the lower tubular part 114.

[0062] The lower tubular part 114 is formed into a tubular, inverted truncated conical shape (tubular body having an inverted conical shape) with an outer diameter and an inner diameter decreasing towards the lower end. The lower tubular part 114 of this embodiment is made up of a thick tubular section 114a close to an upper end opening connected to the connection portion 5, and a thin tubular section 114b connected to an opening edge of a lower end of the thick tubular section 114a with taking into account the flow of a resin during molding.

[0063] Since the lower tubular part 114 is, as described above, connected to the upper peripheral wall portion 10a via the connection portion 5, the thick tubular section 114a has an outer diameter of the opening edge of the upper end, which is smaller than the inner diameter of the lower end opening of the upper peripheral wall portion 10a (peripheral wall body part 110) due to the interposition of the connection portion 5 therebetween, and is formed into a tubular, inverted conical shape with a diameter decreasing towards the lower end.

[0064] The thin tubular section 114b has an opening edge of an upper end connected to an opening edge of the lower end of the thick tubular section 114a so as to form a continuous surface substantially uniform to the inner peripheral surface of the thick tubular section 114a. The thickness of the thin tubular section 114b is smaller than the thick tubular section 114a, and is set at about 0.2 mm to 0.4 mm in this embodiment. The thin tubular section 114b is also formed into a tubular body having a substantially inverted conical shape with a diameter decreasing towards the lower end, in the same manner as the thick tubular section

114a.

[0065] The plural vertical ribs 115 are arranged on the outer peripheral surface of the lower tubular part 114 in a radial pattern with the axis of the lower peripheral portion 10b as the center. Specifically, the plural vertical ribs 115 are arranged with the axis of the lower tubular part 114 as the center as extending through the thick tubular section 114a and the thin tubular section 114b. The vertical ribs 115 of this embodiment each have an upper end connected to a bottom surface of the connection portion 5, and the projection amount of each rib gradually decreases as it advances from the upper end towards the lower end, of the lower tubular part 114.

[0066] The vertical ribs 115 of this embodiment have a projection amount of about 1.5 mm to 2.7 mm around the connection portion between the thick tubular section 114a and the thin tubular section 114b, with reference to the outer peripheral surface of the thin tubular section 114b, and a portion connected to the thin tubular section 114b has a thickness of about 0.6 mm to 0.7 mm. With this, the container body 1 of this embodiment has the outer peripheral surface of the peripheral wall body part 110, an end of each vertical rib 115 and the outer surface of the bottom portion 14, all of which lie on a continuous surface. When the vertical ribs 115 are set at the above size, it is preferable to set the thickness of the thick tubular section 114a in a range of about 0.3 mm to 0.8 mm on the condition that it is thicker than the thickness of the thin tubular section 114b, and the length in the axial direction in a range of about 1 mm to 10 mm, respectively.

[0067] The bottom portion 14 is made up of a bottom plate section 14a having a rounded shape as viewed in plan, and a bottom connection section 14b for connecting the bottom plate section 14a to an opening edge of the lower end of the thin tubular section 114b (peripheral wall 10). The bottom plate section 14a has a rounded area on a substantially center portion bulging slightly and inwardly of

the container body 1.

[0068] The bottom connection section 14b is formed into an annular shape, and has a first side constituting an inner surface of the container body 1, and a second side constituting an outer surface of the container body 1, in which the first side defines a concave surface and the second side defines a convex surface. The bottom connection section 14b has an inner peripheral edge connected to an outer peripheral edge of the bottom plate section 14a, and together with the bottom plate section 14a constitutes the bottom portion 14 of a substantially dish-like shape. An outer peripheral edge of the bottom connection section 14b is connected to an opening edge of a lower end of the lower tubular part 114 (peripheral wall 10).

[0069] The outer shell 2 is formed from a foamed resin sheet having heat shrinkability in the same manner as the first embodiment, and includes a tubular portion 20 covering the peripheral wall 10 of the container body 1 so as to be disposed opposite to the peripheral wall 10, and an annular portion 21 extending (folded back) towards the inside of the tubular portion 20, starting from the lower end of the tubular portion 20.

[0070] The tubular portion 20 has an inner diameter set so as to allow itself to be fitted around the peripheral wall 10 of the container body 1 with a predetermined space to the peripheral wall of the container body 1 (specifically, the outer peripheral surface of the peripheral wall body part 110, and the outer edge of each vertical rib 115 on the outer peripheral surface of the lower peripheral wall portion 10b), and is formed into a tubular, inverted conical shape in this embodiment, corresponding to the peripheral wall 10 of the container body 1.

[0071] The tubular portion 20 of this embodiment is not provided at an upper end opening with the curled portion 22 unlike the first embodiment, and is formed into a substantially circular tubular shape. The upper end opening of the tubular portion 20 has an inner diameter set so as to allow itself to be fitted around the

large diameter part 112 of the container body 1.

[0072] The annular portion 21 is formed so as to have an end side (inner peripheral edge side) disposed away from the inner peripheral surface of the tubular portion 20. Specifically, the annular portion 21 has a distal end (inner peripheral edge) positioned more inwardly of the tubular portion 20 than a proximal end (outer peripheral edge), and is formed into a tapered shape so as to be tapered towards the distal end. The annular portion 21 is inclined at an angle of preferably 30° to 60° to the inner peripheral surface of the tubular portion 20. The annular portion 21 has an inner peripheral edge, from which the horizontal annular extension 23 extends towards the center of the tubular portion 20. The outer shell 2 is fabricated by the same steps as those of the first embodiment and therefore the description on the steps of fabrication of the outer shell 2 will be omitted.

[0073] According to the thus structured heat insulating container, the container body 1 is fitted into the outer shell 2 with the inner peripheral surface of the tubular portion 20 disposed opposite to the outer peripheral surface of the peripheral wall 10 of the container body 1, and as illustrated in FIG. 8, when the upper end of the tubular portion 20 is brought into contact with the lower surface of the top plate section 113a while having the upper end opening of the outer shell 2 (tubular portion 20) fitted around the large diameter part 112 of the container body 1, the bottom portion 14 (bottom plate section 14a) is brought into a state where it is supported with contact to the horizontal annular extension 23, as illustrated in FIG. 9. Whereby, it is possible to prevent the bottom portion 14 (bottom plate section 14a) formed with a thin wall, which is softened by boiled water poured into the container body 1, from being deformed as being bent downwards due to the weight of boiled water or the content. In this state, the space 40 exists between the peripheral wall 10 of the container body 1 (the tubular

peripheral wall body part 110, and the lower tubular part 114) and the tubular portion 20 of the outer shell 2, so that a heat insulating effect can be produced by heat conduction through air (cf. FIG. 7).

[0074] According to the thus structured heat insulating container, when external force has been applied onto the outer shell 2 (lower end) in the radial direction by the grasping of the outer shell 2, the external force acts towards the center of the tubular portion 20 (in a direction orthogonal to the center line of the tubular portion 20), and therefore acts to reduce the diameter of the opening edge of the lower end of the tubular portion 20 or deform the opening edge into a flat shape. At the same time, the external force also acts on the proximal end (outer peripheral edge) of the annular portion 21 in a direction towards the center of the tubular portion 20.

[0075] Accordingly, the annular portion 21, which is formed into an annular shape, tapered towards the inside of the tubular portion 20, allows the external force to act on the annular portion 21 in a direction crossing the plane of the annular portion 21, and therefore reaction force against the external force is caused on the distal end side of the annular portion 21 in an acting direction different from the external force (in such a direction as to expand the inner peripheral edge). Whereby, bending action occurs on the portion of the annular portion 21 between the proximal end and the distal end, so that elastic force caused in the annular portion 21 due to the bending prevents the radial deformation of the tubular portion 20 due to the external force.

[0076] That is, according to the heat insulating container, the annular portion 21 is disposed inwardly of the tubular portion 20 and is tapered with the distal end side positioned away from the inner peripheral surface of the tubular portion 20, so that elastic force is caused on the annular portion 21 when external force has been applied thereon, and this elastic force is utilized so that a satisfactory

strength in the radial direction can be produced to the lower end of the outer shell 2.

[0077] According to the heat insulating container, the horizontal annular extension 23 extends from the distal end of the annular portion 21, thereby capable of enhancing the strength of the inner peripheral edge and its proximity of the annular portion 21 to suppress deformation of the inner peripheral edge and its proximity of the annular portion 21 through the reaction force against external force and hence further increase the strength in the radial direction. That is, the strength of the lower end side of the tubular portion 20 is further increased by efficiently utilizing the elasticity between the proximal end and the distal end, of the annular portion 21 against elastic force. Therefore, when the outer shell 2, which can provide a satisfactory strength for the lower end side of the heat insulating container (outer shell 2), is to be manufactured, it is not necessary to carry out the step of providing a bottom plate for covering a hole defined by the annular portion unlike the prior art, and therefore it is possible to reduce manufacturing costs and material costs for manufacturing the heat insulating container.

[0078] Further, according to the heat insulating container, the annular portion 21 extends in an inclined orientation from the lower end to the inside, of the tubular portion 20, with respect to the inner peripheral surface of the tubular portion 20, thereby forming a recessed portion on the bottom, so that it is possible to hold the heat insulating container with a finger engaged with the annular portion 21. Thus, it is possible to grasp and hold the heat insulating container in a stabilized manner without slipping-off the same. Furthermore, even when the heat insulating container is held with a finger engaged with the annular portion 21, the horizontal annular extension 23 extending from the inner peripheral edge (distal end) of the annular portion 21 can prevent the finger engaged with the

annular portion 21 from touching the bottom portion 14 of the container body 1, and hence prevent burns or any other troubles with the container body 1 even when a food heated at a high temperature is placed therein, thus achieving safety.

[0079] With the plural vertical ribs 115 formed on the lower peripheral wall portion 10b of the peripheral wall 10 of the container body 1, even when the outer shell 2 is deformed in the radial direction by the action of grasping force caused by grasping the outer shell 2, the outer shell 2 contacts the vertical ribs 115 so that the space 40 constantly exists between the lower peripheral wall portion 10b and the outer shell 2 and therefore can constantly keep the heat insulating effect by heat conduction in the space 40.

[0080] According to the heat insulating container of this embodiment, the connection section (bottom connection section 14b) between the peripheral wall 10 and the bottom portion 14, of the container body 1 is rounded to be prevented from being interfered with the outer shell 2, so that the bottom plate section 14a can be held in such a position as to be supported by the horizontal annular extension 23, and hence the strength of the heat insulating container can be further increased.

[0081] The concave surface defined by the inner surface of the bottom portion 14 of the container body 1 (inner surface of the bottom connection section 14b) allows the content of the container body 1 to be easily lifted by a spoon with its leading end moving along the inner peripheral surface of the bottom portion 14 with no content remained in the container body 1.

[0082] Now, the description will be made for a heat insulating container of a third embodiment of the present invention. In this embodiment, the identical or corresponding parts or members to those of the first and second embodiments are given the same names and the same reference characters as those of the first and second embodiments.

[0083] The heat insulating container of this embodiment is made up of a

container body 1 having a bottomed tubular shape and an outer shell 2 that covers a peripheral wall 10 of the container body 1, as illustrated in FIGS. 10 and 11, in the same manner as the first and second embodiments.

[0084] The container body 1 is a resin molded product molded by injection molding by using polypropylene, high-density polyethylene or the like as a material. The container body 1 is made up of a tubular peripheral wall 10, and a bottom portion 14 that closes a lower end opening of the peripheral wall 10.

[0085] The peripheral wall 10 is formed into a tubular, inverted conical shape with a diameter decreasing towards the lower end. Specifically, the peripheral wall 10 is made up of a tubular upper peripheral wall portion 10a defining an opening of the heat insulating container, a lower peripheral wall portion 10b having a diameter smaller than the upper peripheral wall portion 10a and disposed below the upper peripheral wall portion 10a, and an annular connection portion 5 for connection between an opening edge of a lower end of the upper peripheral wall portion 10a and an opening edge of an upper end of the lower peripheral wall portion 10b.

[0086] The upper peripheral wall portion 10a is made up of a tubular peripheral wall body part 110 with an opening edge of the lower end connected to an outer peripheral edge of the connection portion 5, an annular connection part 111 having an annular shape in a horizontal orientation with an inner peripheral edge connected to an opening edge of an upper end of the peripheral wall body part 110, a tubular, large diameter part 112 with an opening edge of a lower end connected to an outer peripheral edge of the annular connection part 111, and a flange part 113 extending outwards from an opening edge of an upper end of the large diameter part 112.

[0087] The peripheral wall body part 110 of this embodiment has a substantially uniform wall thickness in the peripheral direction and the axial direction, and is

formed into a tubular, inverted conical shape with a diameter decreasing towards the lower end. The opening edge of the lower end is connected to the outer peripheral edge of the connection portion 5. Reinforcing pieces 117 extend downwards from the lower end of the peripheral wall body part 110 so as to increase the strength of the container body 1 in the radial direction. The reinforcing pieces 117 are formed with a predetermined distance from the outer peripheral surface of the lower peripheral wall portion 10b, each having lateral sides connected to later-described vertical ribs 115.

[0088] The annular connection part 111 has, as described above, the outer peripheral edge connected to the opening edge of the upper end of the peripheral wall body part 110, and is formed into a flange around the peripheral wall body part 110.

[0089] The large diameter part 112 has a substantially circular tubular shape and has an opening edge of the lower end connected to the outer peripheral edge of the annular connection part 111. With this, the large diameter part 112, the annular connection part 111 and the peripheral wall body part 110 together form a stepped portion around an opening of the upper end of the upper peripheral wall portion 10a (container body 1), so that a top surface of the annular connection part 111 can be used as a formed line providing an indication for the amount of boiled water or the like to be poured in.

[0090] The flange part 113 is made up of a top plate section 113a having an annular shape in a horizontal orientation and a downward extension 113b extending downwards from an outer peripheral edge of the top plate section 113a, and has a substantially L-shape in cross section. The flange part 113 with the top plate section 113a whose inner peripheral edge is connected to the opening edge of the upper end of the large diameter part 112, so that an upper surface of the top plate section 113a forms an upper end surface of the heat insulating container.

The flange part 113 is designed to allow a sealing lid (not shown) made of a laminate of aluminium foil and synthetic resin film or paper to be detachably attached to the top plate section 113a, so as to seal the container body 1 with a content (such as instant noodles or soup eatable by pouring boiling water thereinto) placed therein.

[0091] The lower peripheral wall portion 10b has an opening edge of the upper end connected to the upper peripheral wall portion 10a via the connection portion 5, and a lower end opening closed by the bottom portion 14. The lower peripheral wall portion 10b is formed into a tubular, inverted conical shape (tubular body having an inverted truncated conical shape) with an outer diameter and an inner diameter decreasing towards the lower end. Likewise the lower tubular part 114 of the second embodiment, the lower peripheral wall portion 10b of this embodiment is made up of a thick tubular section 114a close to an upper end opening connected to the connection portion 5, and a thin tubular section 114b connected to an opening edge of a lower end of the thick tubular section 114a with taking into account the flow of a resin during molding.

[0092] Since the lower peripheral wall portion 10b is, as described above, connected to the upper peripheral wall portion 10a via the connection portion 5, the thick tubular section 114a has an outer diameter of the opening edge of the upper end, which is smaller than the inner diameter of the lower end opening of the upper peripheral wall portion 10a (peripheral wall body part 110) due to the interposition of the connection portion 5 therebetween, and is formed into a tubular, inverted conical shape with a diameter decreasing towards the lower end.

[0093] The thin tubular section 114b has an opening edge of an upper end connected to an opening edge of the lower end of the thick tubular section 114a so as to form a continuous surface substantially uniform to the inner peripheral surface of the thick tubular section 114a. The thickness of the thin tubular

section 114b is smaller than the thick tubular section 114a, and is set at about 0.2 mm to 0.4 mm in this embodiment. The thin tubular section 114b is also formed into a tubular body having a substantially inverted conical shape with a diameter decreasing towards the lower end, in the same manner as the thick tubular section 114a.

[0094] The peripheral wall 10 of the thus structured container body 1 is provided on its outer peripheral surface with plural vertical ribs 115 arranged in a radial pattern with the axis of the container body 1 as the center as extending through the peripheral wall body part 110 and the lower peripheral wall portion 10b. The plural vertical ribs 115 are formed so as to each have an upper end connected to a bottom surface of the annular connection part 111, and an upper end defining a continuous surface with the outer peripheral surface of the large diameter part 112 (the upper end positioned not protruding outwardly from the outer peripheral surface of the large diameter part 112), and to extend downwards while protruding outwards from the reinforcing pieces 117. The projection amount of each vertical rib 115 in its second side lower than the reinforcing pieces 117 gradually decreases towards the lower end, so that the lower end defines a continuous surface with the outer surface of a later described bottom portion 14 (bottom connection section 14b). The vertical ribs 115 of this embodiment have a projection amount of about 1.5 mm to 2.7 mm around the connection portion between the thick tubular section 114a and the thin tubular section 114b, with reference to the outer peripheral surface of the thin tubular section 114b, and a portion connected to the thin tubular section 114b has a thickness of about 0.6 mm to 0.7 mm. With this, the container body 1 of this embodiment has the outer peripheral surface of the peripheral wall body part 110, an end of each vertical rib 115 and the outer surface of the bottom portion 14, all of which lie on a continuous surface. When the vertical ribs 115 are set at the above size, it is preferable to set the thickness of the

thick tubular section 114a in a range of about 0.3 mm to 0.8 mm on the condition that it is thicker than the thickness of the thin tubular section 114b, and the length in the axial direction in a range of about 1 mm to 10 mm, in the same manner as the second embodiment.

[0095] The bottom portion 14 is made up of a bottom plate section 14a having a rounded shape as viewed in plan, and a bottom connection section 14b for connecting the bottom plate section 14a to an opening edge of the lower end of the thin tubular section 114b (peripheral wall 10). The bottom plate section 14a has a rounded area on a substantially center portion bulging slightly and inwardly of the container body 1.

[0096] The bottom connection section 14b is formed into an annular shape, and has a first side constituting an inner surface of the container body 1, and a second side constituting an outer surface of the container body 1, in which the first side defines a concave surface and the second side defines a convex surface. The bottom connection section 14b has an inner peripheral edge connected to an outer peripheral edge of the bottom plate section 14a, and together with the bottom plate section 14a, constitutes the bottom portion 14 of a substantially dish-like shape. An outer peripheral edge of the bottom connection section 14b is connected to an opening edge of a lower end of the lower peripheral wall portion 10b (peripheral wall 10).

[0097] The outer shell 2 is made of a foamed resin sheet having heat shrinkability in the same manner as the first and second embodiments, and includes the tubular portion 20 covering the peripheral wall 10 of the container body 1 so as to be disposed opposite to the peripheral wall 10, and an annular portion 21 extending (folded back) towards the inside of the tubular portion 20, starting from the lower end of the tubular portion 20.

[0098] The tubular portion 20 has an inner diameter set so as to allow itself to be

fitted around the peripheral wall 10 of the container body 1 with a predetermined space to the peripheral wall 10 of the container body 1 (specifically, the outer peripheral surface of the peripheral wall body part 110, and the outer edge of each vertical rib 115 on the outer peripheral surface of the lower peripheral wall portion 10b), and is formed into a tubular, inverted conical shape in this embodiment, corresponding to the peripheral wall 10 of the container body 1.

[0099] The tubular portion 20 of this embodiment is not provided at upper end opening of with the curled portion 22 unlike the first embodiment, and is formed into a substantially circular tubular shape. The upper end opening of the tubular portion 20 has an inner diameter set so as to allow itself to be fitted around the large diameter part 112 of the container body 1.

[0100] The annular portion 21 has a distal end (inner peripheral edge) positioned more inwardly of the tubular portion 20 than a proximal end (outer peripheral edge), and is formed into a tapered shape so as to be tapered as it advances towards the distal end, in the same manner as the first and second embodiments. The outer shell 2 is fabricated by the same steps as those of the first and second embodiments and therefore the description on the steps of fabrication of the outer shell 2 will be omitted.

[0101] According to the thus structured heat insulating container, the container body 1 is fitted in the outer shell 2 with the inner peripheral surface of the tubular portion 20 disposed opposite to the outer peripheral surface of the peripheral wall 10 of the container body 1, and as illustrated in FIG. 12, when the upper end of the tubular portion 20 is brought into contact with the lower surface of the top plate section 113a while having the upper end opening of the outer shell 2 (tubular portion 20) fitted around the large diameter part 112 of the container body 1, the bottom portion 14 (bottom plate section 14a) is brought into a state where it is supported with contact to the horizontal annular extension 23, as illustrated in

FIG. 13. Whereby, it is possible to prevent the bottom portion 14 (bottom plate section 14a) formed with a thin wall, which is softened by boiled water poured into the container body 1, from being deformed as being bent downwards due to the weight of boiled water or a content. In this state, the space 40 exists between the peripheral wall 10 of the container body 1 (the tubular peripheral wall body part 110, and the lower peripheral wall portion 10b) and the tubular portion 20 of the outer shell 2, so that a heat insulating effect can be produced by heat conduction through air (cf. FIG. 11).

[0102] According to the thus structured heat insulating container, when external force has been applied onto the outer shell 2 (lower end) in the radial direction by the grasping of the outer shell 2, the external force acts towards the center of the tubular portion 20 (in a direction orthogonal to the center line of the tubular portion 20), and therefore acts to reduce the diameter of the opening edge of the lower end of the tubular portion 20 or deform the opening edge into a flat shape. At the same time, the external force also acts on the proximal end (outer peripheral edge) of the annular portion 21 in a direction towards the center of the tubular portion 20.

[0103] Accordingly, the annular portion 21, which is formed into an annular shape, tapered towards the inside of the tubular portion 20, allows the external force to act on the annular portion 21 in a direction crossing the plane of the annular portion 21, and therefore reaction force against the external force is caused on the distal end side of the annular portion 21 in an acting direction different from the external force (in such a direction as to expand the inner peripheral edge). Whereby, bending action occurs on the portion of the annular portion 21 between the proximal end and the distal end, so that elastic force caused in the annular portion 21 due to the bending prevents the radial deformation of the tubular portion 20 due to the external force.

[0104] That is, according to the heat insulating container, the annular portion 21 is disposed inwardly of the tubular portion 20 and is tapered with the distal end side positioned away from the inner peripheral surface of the tubular portion 20, so that elastic force is caused on the annular portion 21 when external force has been applied thereon, and this elastic force is utilized so that a satisfactory strength in the radial direction can be produced to the lower end of the outer shell 2.

[0105] According to the heat insulating container, the horizontal annular extension 23 extends from the distal end of the annular portion 21, thereby capable of enhancing the strength of the inner peripheral edge and its proximity of the annular portion 21 to suppress deformation of the inner peripheral edge and its proximity of the annular portion 21 and hence further increase the strength in the radial direction. That is, the strength on the lower end side of the tubular portion 20 is increased by efficiently utilizing the elasticity between the proximal end and the distal end, of the annular portion 21 against elastic force. Therefore, even in the heat insulating container of this embodiment, when the outer shell 2 is to be manufactured, it is not necessary to carry out the step of providing a bottom plate for covering a hole defined by the annular portion unlike the prior art, and therefore it is possible to reduce manufacturing costs and material costs for manufacturing the heat insulating container.

[0106] Further, according to the heat insulating container, the annular portion 21 extends in an inclined orientation from the lower end to the inside, of the tubular portion 20, with respect to the inner peripheral surface of the tubular portion 20, thereby forming a recessed portion on the bottom, so that it is possible to hold the heat insulating container with a finger engaged with the annular portion 21. Thus, it is possible to grasp and hold the heat insulating container in a stabilized manner without slipping-off the same. Furthermore, even when the

heat insulating container is held with a finger engaged with the annular portion 21, the horizontal annular extension 23 extending from the inner peripheral edge (distal end) of the annular portion 21 can prevent the finger engaged with the annular portion 21 from touching the bottom portion 14 of the container body 1, and hence prevent burns or any other troubles with the container body 1 even when a food heated at a high temperature is placed therein, thus achieving safety.

[0107] According to the heat insulating container of this embodiment, the connection section (bottom connection section 14b) between the peripheral wall 10 and the bottom portion 14, of the container body 1 is rounded to be prevented from being interfered with the tubular portion 20 of the outer shell 2, so that only the bottom connection section 14b can be held in such a position as to be supported by the horizontal annular extension 23, and hence the strength of the heat insulating container can be further increased.

[0108] Further, according to the heat insulating container, with the plural vertical ribs 115 formed on the peripheral wall 10 of the container body 1 throughout its entire area, even when the outer shell 2 is deformed in the radial direction by the action of grasping force caused by grasping the outer shell 2, the outer shell 2 contacts the outer edges of the vertical ribs 115 so that the space 40 exists throughout substantially the entire area between the peripheral wall 10 and the outer shell 2 and therefore can constantly keep the heat insulating effect by heat conduction in the space 40.

[0109] In the same manner as the second embodiment, the concave surface defined by the inner surface of the inner peripheral surface (bottom connection section 14b) of the bottom portion 14 of the container body 1 allows the content of the container body 1 to be easily lifted by a spoon with its leading end moving along the inner peripheral surface of the bottom portion 14 with no content remained in the container body 1.

[0110] The heat insulating container of the present invention is not necessarily limited to the first to third embodiments, and it is a matter of course that various modifications may be applied thereto within the scope not departing from the gist of the present invention.

[0111] In the first to third embodiments, as the foamed resin sheet S for forming the outer shell 2, a sheet of foamed polystyrene is solely used, but the foamed resin sheet S for forming the outer shell 2 is not necessarily limited thereto. For example, it is possible to employ a sheet having a non-foamed resin layer arranged on one or each of both sides of a foamed polystyrene layer, or the like.

[0112] In this case, the foaming rate and the components, of the foamed polystyrene layer are set to be the same as those of foamed polystyrene sheet of the above embodiment. For the non-foamed resin layer, a styrene type resin such as polystyrene, styrene, butadiene copolymer and styrene acrylic copolymer or the mixture thereof, or a styrene type resin with a resin such as polyethylene and ethylene-vinyl acetate copolymer mixed therein is preferable, but also polyethylene or a polypropylene type resin may be employed. This non-foamed resin layer has a thickness of preferably about 3 to 30 μm. A non-foamed resin layer may be formed by coextrusion with a foamed resin sheet. Alternatively, it may be formed by laminating with a separately prepared film. In this case, it is possible to print on a non-foamed resin film.

[0113] For the foamed resin sheet (foamed layer), those of the aforesaid polystyrene type resin are preferable since they are excellent in heat insulating performance and stiffness, but it is also possible to employ a laminate of a foamed layer of a polypropylene type resin or a polyethylene type resin and a non-foamed, heat shrinkable polyester film.

[0114] In the above embodiments, the annular portion 21 is provide at its distal end (inner peripheral edge) with the horizontal annular extension 23, but it is not

necessary to limit to this. The strength in the radial direction of the tubular portion 20 may be obtained only by the annular portion 21.

[0115] Although the tubular portion 20 of the outer shell 2 as employed in the first to third embodiments has a diameter decreasing towards the lower end, it is not necessary to limit to this. For example, it is a matter of course that the tubular portion 20 may be formed into a substantially circular tubular shape or rectangular tubular shape.

[0116] In the first to third embodiments, the outer shell 2 is molded by the use of the mold 50 having the second end with the annular protrusion 53 formed thereon and the press die 51, but it is possible to employ the mold 50 having a tubular shape. That is, it is essential that the mold 50 has an outer peripheral surface for forming the tubular portion 20 and allows the press die 51 to press an opposite end of the tubular foamed resin sheet S fitted on the mold 50.

[0117] The annular protrusion 53 is not also necessarily limited to the shape of the first to third embodiments, which is formed to correspond to the incline angle of the inner peripheral surface to the annular portion 21, of the tubular portion 20. That is, since the outer shell 2 is formed by the foamed resin sheet S having shrinkability, shrinking force acts on the tubular foamed resin sheet towards the center when the sheet is pressed by the press die 51. This shrinking force thus enables the formation of the annular portion 21 conforming to the outer peripheral shape of the protrusion 54. Therefore, since the annular portion 21 is not formed by the inner peripheral surface of the annular protrusion 53, it is possible to form the annular portion 21 corresponding to the outer peripheral surface of the protrusion 54 when the protrusion 54 of the press die is formed with high precision.

[0118] In the second and third embodiments, the reinforcing pieces 117 are arranged along the lower end edge of the peripheral wall body part 110 so as to

increase the strength of the peripheral wall 10 of the container body 1 in the radial direction. This is not essential and therefore it is possible to increase the strength in the radial direction by, for example, forming the peripheral wall 10 into a step shape. Even with this arrangement, since the heat insulating container includes the outer shell 2, the grasping force when grasping the heat insulating container does not directly act on the container body 1, and therefore a satisfactory strength is ensured. However, in view of the safety or the like reason, it is preferable to provide the reinforcing pieces 117 in the same manner as the second and third embodiments.

[0119] Although the container body 1 is supported with the horizontal annular extension 23 of the outer shell 2 held in contact with the bottom portion 14 (bottom plate section 14a) of the container body 1 in the second and third embodiments, it is not necessary to limit to this. It is a matter of course to employ the arrangement in which a clearance is created between the horizontal annular extension 23 and the bottom plate section 14a, thereby allowing air between the peripheral wall 10 of the container body 1 and the tubular portion 20 of the peripheral wall 10 to be communicated with the outside.

[0120] Although the top surface of the annular connection part 111 is used as a formed line providing an indication for boiled water to be poured in second and third embodiments, it is not necessary to limit to this. For example, a ridge may be formed on the inner peripheral surface of the container body 1 in the peripheral direction, and this ridge may be served as a formed line. However, it is not essential to provide a formed line, and therefore it may be appropriately provided according to the content placed.

[0121] Although the peripheral wall 10 is formed into a step shape in the second and third embodiments, it is not necessary to limit to this. The peripheral wall 10 may be formed into a substantially circular tubular shape or a tubular, inverted

conical shape without providing a step shape oriented in a direction from the lower end towards the upper end. Even with the thus structured peripheral wall 10, the vertical ribs 115 extending from the upper end to the lower end, of the peripheral wall 10 can provide a heat insulating effect in the same manner as the second and third embodiments, since the vertical ribs 115 prevent the peripheral wall 10 to be tightly contacted with the outer shell 2 (tubular portion 20) even when the outer shell 2 is deformed by grasping the same, and can constantly create a space for enhancing the heat insulating performance in the area where the vertical ribs 115 are disposed.

[0122] Although, in the first embodiment, the annular portion 21 is disposed so as to have the distal end with a space to the bottom portion 14 of the container body 1, thereby allowing air within the space 40 to be released to the outside, it is not necessary to limit to this. The bottom portion 14 of the container body 1 may be supported by the distal end of the annular portion 21. That is, since the tubular portion 20 (outer shell 2) is formed by a foamed resin, it is possible to produce a satisfactory heat insulating effect even without releasing air within the space 40 to the outside. Therefore, it is not necessary to employ the structure enabling air within the space 40 to be released to the outside, so that a required heat insulating effect may be produced in consideration of the content placed in the container body 1, or the like.

[0123] Although, in the second embodiment, the tubular peripheral wall body part 110 of the upper peripheral wall portion 10a are formed with plural gutters 110a and plural ridges 110b formed alternately, it is not necessary to limit to this. It is a matter of course to have the peripheral wall body part 110 set to a uniform wall thickness. However, in order to efficiently form the peripheral wall body part 110 with stable quality when molding the container body 1 of the heat insulating container, it is preferable to form the peripheral wall body part 110

with the gutters 110a and the ridges 110b in the same manner as the second embodiment. Therefore, while the peripheral wall 10 of the container body 1 is formed with a substantial uniform thickness in the first embodiment, it is not necessary to limit to this. It is a matter of course to form the peripheral wall 10 with plural gutters and plural ridges alternately formed, in the same manner as the peripheral wall body part 110 of the second embodiment.

[0124] Although the lower peripheral wall portion 10b of the container body 1 is provided with the vertical ribs 115 in the second embodiment, it is not necessary to limit to this. The vertical ribs 115 may be provided in the substantially entire area of the peripheral wall 10 of the container body 1 in the same manner as the third embodiment. That is, when the vertical ribs 115 are to be provided, they may be provided to at least one of the peripheral wall body part 110 and the lower peripheral wall portion 10b, and preferably at least to the lower peripheral wall portion 10b. However, it is not necessary to provide the vertical ribs 115 on the peripheral wall 10 of the container body 1, and it is a matter of course to form the peripheral wall 10 of the container body 1 with a substantially uniform wall thickness in the same manner as the first embodiment.